ISSN 1809-127X (online edition)
© 2011 *Check List* and Authors
Open Access | Freely available at *www.checklist.org.br*

Check List
Journal of species lists and distribution

NOTES ON GEOGRAPHIC DISTRIBUTION

Gastropoda, Pulmonata, Lymnaeidae, *Pseudosuccinea columella* (Say, 1817): First record in Córdoba province, central Argentina

Agustín Zarco [1*], M. Cecilia Fantozzi [2] and Pablo F. Cuervo [2]

1 Universidad Nacional de Córdoba, Facultad de Ciencias Exactas, Físicas y Naturales. Avenida Vélez Sarsfield 299, 5000. Córdoba, Argentina.
2 Universidad Juan A. Maza, Facultad de Ciencias Veterinarias y Ambientales, Parasitología y Enfermedades Parasitarias. Avenida De Acceso Este, Lateral Sur 2245, 5519. Guaymallén, Mendoza, Argentina.
* Corresponding author. E-mail: *azarco@mendoza-conicet.gob.ar*

ABSTRACT: *Pseudosuccinea columella* (Say, 1817) is a lymnaeid snail with great invasive capabilities, and has, at present, a worldwide distribution. So far, the presence of this lymnaeid snail in Argentina was restricted to a few provinces in the northeastern region, such as Misiones, Corrientes, Entre Ríos and some botanical gardens in Buenos Aires, but the recent discovery of specimens in central Argentina (Córdoba) not only represents the first record for the region, but also the southernmost confirmed record in the wild for the Neotropical region and the westernmost for the country.

Pseudosuccinea columella (Say, 1817) is a worldwide distributed species of lymnaeid snail, particularly known because of its invasive capabilities in recent decades (Pointier *et al*. 2007). In Argentina, it has been reported in several localities, such as San Javier on the Uruguaí river (Misiones), on Paraná river and along the banks of the Aguapey river (Corrientes) (Hylton Scott 1954; Castellanos and Landoni 1981), Berón de Astrada (Corrientes) (Prepelitchi *et al*. 2003), Santo Tomé (Corrientes) (Moriena *et al*. 2008), Paso de los Libres and Ituzaingó (Corrientes), between Federación and Concordia (Entre Ríos) (Paraense 2005), and two botanical gardens in La Plata and Capital Federal (Buenos Aires) (Castellanos and Landoni 1981; Zelaya 2002). Rumi *et al*. (2008) indicate that *P. columella* is present in the provinces of Misiones, Corrientes, Buenos Aires, Entre Ríos and Santa Fe, but without further information on the sites.

Pseudosuccinea columella is a snail of medical interest, since it has been reported as an effective and highly susceptible intermediate host for the zoonotic trematode *Fasciola hepatica* (Linnaeus, 1758) in different parts of the world (Boray *et al*. 1985; Cruz-Reyes and Malek 1987; Rondelaud and Barthe 1987; Dacal *et al*. 1988; Mas-Coma *et al*. 2009), and being found naturally infected in Australia (Boray *et al*. 1985), Brazil (Ueta 1980; Oliveira *et al*. 2002), Cuba (Gutiérrez *et al*. 2011), Perú (Larrea *et al*. 2007), Colombia (Salazar *et al*. 2006) and Argentina (Prepelitchi *et al*. 2003).

In this paper the presence of *P. columella* is registered in Córdoba province (central Argentina) for the first time.

As part of a continuous surveillance project, snail sampling was carried out at the beginning of summer, in September - October, during 3 consecutive years between 2006 and 2008 in Suquía river, in La Calera commune, Córdoba, Argentina (31°20'48.42" S, 64°20'42.12" W) (Figure 1). The Suquía river basin is located in the semi-arid region of Córdoba province, central Argentina. The sampling site is biogeographically located in the Chaco Serrano sub-region, (Cabrera 1976). The mean annual precipitation is between 700-900 mm, and mean annual temperature 14-16°C (maximum annual temperature: 20-24°C, minimum annual temperature: 10-11°C) (Vazquez *et al*. 1979).

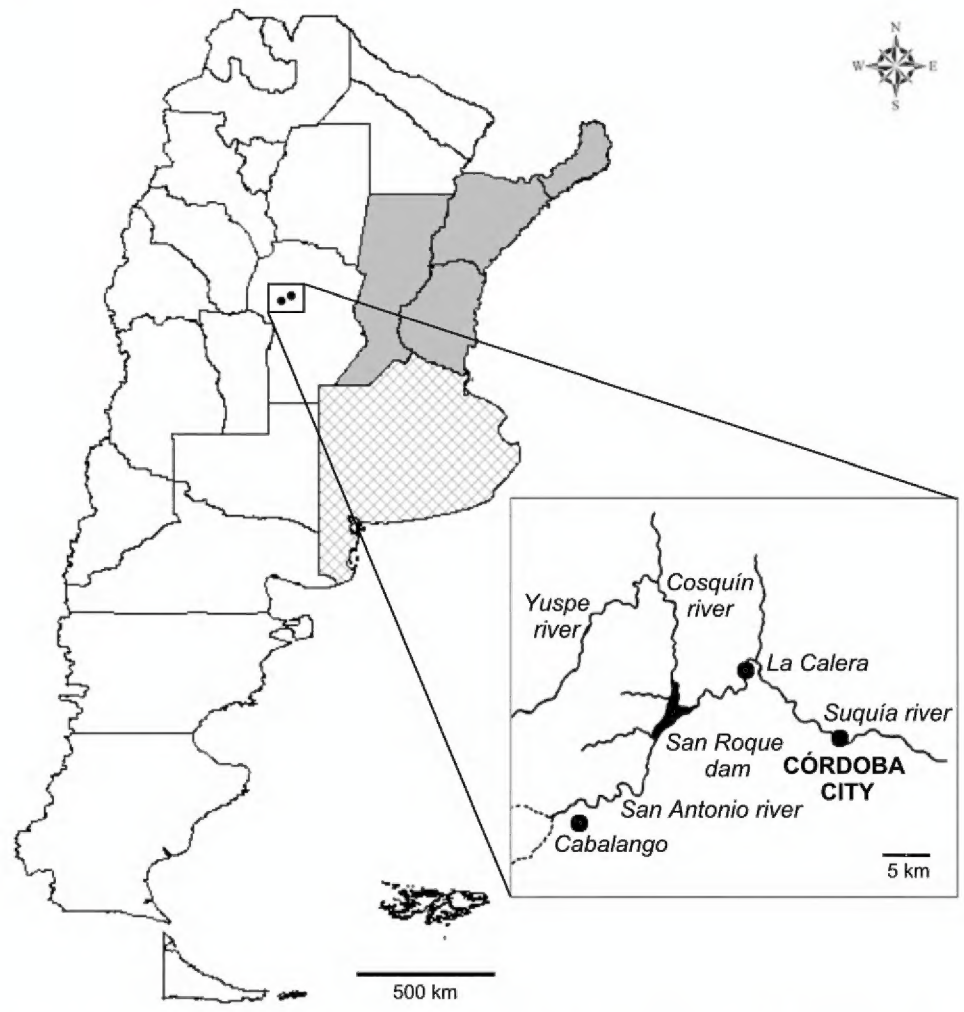

FIGURE 1. Map of Argentina showing the provinces with presence of *Pseudosuccinea columella* (in solid fill grey, populations in the wild; in diagonal cross fill grey, populations in botanical gardens) and the sampling sites in Córdoba province.

Snails were manually collected along the banks of the river and transferred alive to the laboratory, where they were maintained for morphological/morphometric studies (voucher specimens deposited at the malacological collection of "Parasitología y Enfermedades Parasitarias, Facultad de Ciencias Veterinarias y Ambientales, Universidad Juan A. Maza").

Thirty-three snails were collected in Suquía river (Figure 2), and 27 shells were analyzed considering standard measures: Shell Length (SL), Shell Width (SW), Last Spire Length (LSL), Aperture Length (AL) and Aperture Width (AW). The SW/SL, AW/AL and AL/SL means were also calculated. On the other hand, a new population was discovered in Cabalango commune (31°23'50.34" S, 64°33'31.19" W), with eleven snails collected (Figure 1). In both sites shells showed all the characteristics of *P. columella* as described by Hylton Scott (1954), Castellanos and Landoni (1981) and Paraense (1983): tear-shaped shell with a short spire of pointed apex and a large last whorl occupying about three times the length of the rest of the shell (Figure 3), a large and oval aperture, and presence of characteristic minute spiral ridges of the periostracum. Suquía river also harbored the common - snail *Physa acuta*, **Heleobia** spp. and **Pomacea** spp.

Figure 2. Sampling site of *Pseudosuccinea Columella* in La Calera commune, Cordoba, Argentina.

The shell's morphometry results are the following (in mm): SL 7.04-14.23 (mean 10.16, ± 1.707), SW 3.83-6.43 (mean 4.99, ±0.725), LSL 6.12-12.86 (mean 8.67, ±1.615), AL 4.59-9.18 (mean 6.32, ±1.216), AW 2.76-5.82 (mean 3.95, ±0.727), SW/SL mean 0.51 (±0.026); AW/AL mean 0.64 (±0.046), AL/SL mean 0.63 (±0.036). All the shells measured were from adult snails, the 76% corresponding to shells with 4 whorls, and the rest with 3.

This is the first description of *P. columella* for Córdoba province, being, as well, the southernmost confirmed report of the species in the wild for the Neotropical region, and the westernmost distribution in the country. It is suspected that the introduction of these exotic taxa in the country was due to anthropic activity, particularly as a byproduct of the aquarium trade, and so could be its expansion.

The identification of the specimens as *P. columella* is supported by the unmistakable shell morphology and by the morphometry data, coincident with previous descriptions by Hylton Scott (1954), Castellanos and Landoni (1981) and Paraense (1994).

The description of this species in other provinces than the ones previously reported is considered important. *P. columella* is believed to play a fundamental role in the expansion of animal fascioliasis along the province of Corrientes, where seems to be the only vector associated with the majority of the local epidemics (Moriena *et al*. 2008). Not only livestock could be affected, but the important question arises around human health, particularly when considering that La Calera commune is densely inhabited, but also is as far as 20 km from the province's capital with the Suquía river passing through the city. Further researches are required in order to assess about the distribution of this vector snail and its role in the epidemiology of fascioliasis in diverse environments.

Figure 3. *Pseudosuccinea columella* snail (shell length: 12.86 mm).

Literature Cited

Boray, J.C., G.C. Fraser, J.D. Williams and J.M. Wilson. 1985. The occurrence of the snail *Lymnaea columella* on grazing areas in New South Wales and studies on its susceptibility to *Fasciola hepatica*. *Australian Veterinary Journal* 62(1): 4-6.

Cabrera, A.L. 1976. Regiones fitogeográficas argentinas. *In* W.F. Kugler (ed.). *Enciclopedia Argentina de Agricultura y Jardinería, 2nd ed., Vol. II Tomo 1*. Buenos Aires: Acme.

Castellanos, Z.A. and N.A. Landoni. 1981. Mollusca Gastropoda Lymnaeidae; p. 55-82 *In* Z.A. Castellanos and N.A. Landoni (ed.). *Fauna de Agua Dulce de la Republica Argentina, 15*. Buenos Aires: Fundación para la Educación, la Ciencia y la Cultura.

Cruz-Reyes, A. and E.A. Malek. 1987. Suitability of six lymnaeids snails for infection with *Fasciola hepatica*. *Veterinary Parasitology* 24(3-4): 203-210.

Dacal, A.R.C., H.M.A. Costa and A.C.R. Leite. 1988. Susceptibilidade de *Lymnaea* (*Pseudosuccinea*) *columella* (Say, 1817) exposta à infecção por miracídios de *Fasciola hepatica* (Linnaeus, 1758). *Revista do Instituto de Medicina Tropical de São Paulo* 30(5): 361-369.

Gutiérrez, A., A.A Vázquez, Y. Hevia, J. Sánchez, A.C. Correa, S. Hurtrez-Boussès, J.P. Pointier and A. Théron. 2011. First report of larval stages of *Fasciola hepatica* in a wild population of *Pseudosuccinea columella* from Cuba and the Caribbean. *Journal of Helminthology* 85: 109-111

Hylton Scott, M.I. 1954. Sobre "Limnaeidae" argentinos (Mol. Pulm.). *Physis* 20(59): 401-408.

Larrea, H.C., M.F. Flórez, R.G. Vivar, P.M. Huamán and J.P. Velásquez. 2007. Hospederos intermediarios de *Fasciola hepatica* en Perú. *Revista Horizonte Médico* 7(1): 39–46.

Mas-Coma, S., M.A. Valero and M.D. Bargues. 2009. *Fasciola*, lymnaeids and human fascioliasis, with a global overview on disease, transmisión, epidemiology, evolutionary genetics, molecular epidemiology and control. *Advances in Parasitology* 69(2): 41-146.

Moriena, R.A., J.D. Alvarez, S. Pietrokovsky, D. Rubel, L. Prepelitchi, O. Racioppi and C. Wisnivesky. 2008. Presencia de *Pseudosuccinea columella* naturalmente infestada con *Fasciola hepatica* en Santo Tomé (Corrientes, Argentina). *Revista Veterinaria* 19(2): 147-149.

Oliveira, S., T. Fujii, E. Filha and A. Martins. 2002. Ocorrencia de *Lymnaea columella* Say, 1817 infectada naturalmente por *Fasciola hepatica* (Linnaeus, 1758), no Vale do Ribeira, São Paulo, Brasil. *Arquivos do Instituto Biológico de São Paulo* 69(1): 29-37.

Paraense, W.L. 1983. *Lymnaea columella* in northern Brazil. *Memorias do Instituto Oswaldo Cruz* 78(4): 477-482.

Paraense, W.L. 1994. *Limnaea peregrina* Clesin, 1882, Synonym of *Lymnaea columella* Say, 1817 (Gastropoda: Lymnaeidae). *Memorias do Instituto Oswaldo Cruz* 89(4): 561-566.

Paraense, W.L. 2005. Planorbidae, Lymnaeidae and Physidae of Argentina (Mollusca: Basommatophora). *Memorias do Instituto Oswaldo Cruz* 100(5): 491-493.

Pointier, J.P., C. Coustau, D. Rondelaud and A. Theron. 2007. *Pseudosuccinea columella* (Say, 1817) (Gastropoda, Lymnaeidae), snail host of *Fasciola hepatica*: first record for France in the wild. *Parasitology Research* 101(5): 1389–1392.

Prepelitchi L., F. Kleiman, S.M. Pietrokovsky, R.A. Moriena, O. Racioppi, J. Alvarez and C. Wisnivesky-Colli. 2003. First report of *Lymnaea columella* Say, 1817 (Pulmonata: Lymnaeidae) naturally infected with *Fasciola hepatica (*Linnaeus, 1758) (Trematoda: Digenea) in Argentina. *Memorias do Instituto Oswaldo Cruz* 98(7): 889-891.

Rondelaud, D. and D. Barthe. 1987. *Fasciola hepatica* L.: Etude du développement des rédies chez quatre espèces de limnées. *Bulletin de la Société Française de Parasitologie* 5: 99–104.

Rumi, A., D.E. Gutiérrez, V. Núñez and G. Darrigran. 2008. Malacología latinoamericana. Moluscos de agua dulce de Argentina. *Revista de Biología Tropical* 56(1): 77-111.

Salazar, L., V.E. Estrada and L.E. Velásquez. 2006. Effect of the exposure to *Fasciola hepatica (*Trematoda: Digenea) on life history traits of *Lymnaea cousini* and *Lymnaea columella* (Gastropoda: Lymnaeidae). *Experimental Parasitology* 114(2): 77–83.

Ueta, M.T. 1980. Ocorrencia de infecção natural de *Fasciola hepatica* Linnaeus, 1758 em *Lymnaea columella* Say, 1817 no Vale do Paraiba, SP, Brasil. *Revista de Saúde Pública* 14(2): 230–233.

Vazquez, J.B., A. López Robles, D.F. Sosa and M.P. Saes. 1979. Aguas; p. 139-211. *In* J.B. Vázquez, R.A. Miatello and M.E. Roque (ed.). *Geografía Física de la Provincia de Córdoba*. Buenos Aires: Boldt.

Zelaya, D. 2002. First record of *Pseudosuccinea columella* (Mollusca: Lymnaeidae) in Buenos Aires City. Comunicaciones de la Sociedad Malacológica del Uruguay 7: 145-146.

Received: August 2010
Last Revised: March 2011
Accepted: April 2011
Published online: July 2011
Editorial responsibility: Inga Ludmila Veitenheimer Mendes